

CARPET GRASS, *AXONOPUS* SPP.

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INTRODUCTION

For many years the apparent difference between broad-leaved and narrow-leaved forms of *Axonopus compressus*, or Carpet grass, has not been generally regarded as of specific rank, although the names *Paspalum platycaule* Poir. for the broad-leaved form, and *Paspalum compressum*, for the narrow-leaved form, have been used by some persons. The original *Paspalum compressum*, Swartz., is however, undoubtedly the broad-leaved grass.

These two Carpet grasses have now been recognised as distinct species, the broad-leaved form retaining the present name (*Axonopus compressus* Beauv.), while Miss Agnes Chase, an American authority, has defined the narrow-leaved grass as a new species, and named it *Axonopus affinis*, as follows:—

Axonopus affinis, sp. novo.

Ab *Axonopo compresso* differt: Culmis et stolonibus gracilioribus, laminis augustioribus; spiculis brevioribus, 2 mm. longis, obtusis vel subacutis. (Culms and stolons more slender, leaf-blades narrower; spikelets shorter, 2 mm. long, obtuse or sub-acute).

"The plants are more tufted than in *A. compressus*, sometimes forming dense mats with short rhizomes, and the flowering culms in such colonies are relatively few.

Stolons slender, the internodes short, and the leaf-blades (usually) not conspicuously shorter than those of the culms, as in *A. compressus*.

Culms erect or geniculate ascending, slender, nodes glabrous (?) sheaths compressed, on the average narrower than those of *A. compressus*, leaf-blades flat or folded, 2 to 6 mm. wide.

Peduncles very slender 1 to 3 within uppermost sheath of flowering culm, finally elongate; racemes 2 to 4; 2 to 10 cm. long, spikelets oblong-elliptic rather more plump than in *A. compressus*, 2 mm. long, 0.8 to 0.9 mm. wide, blunt or abruptly acute. The glume and sterile lemma equal, covering the fruit or slightly pointed beyond it, 4 nerved, mid-nerves suppressed, sparsely silky-pilose at base and summit, and sometimes along the nerves. Fruit pale, 1.7 to 1.8 mm. long, blunt." (Agnes Chase).

HISTORY

Axonopus compressus, Beauv., is a native of the West Indies and tropical America, and has spread to Florida and Louisiana in the United States. It was introduced to Singapore about 1895 to 1900, for Ridley refers to *Paspalum*

platycaule in 1903 as "lately established in Singapore", since when it has spread to all parts of Malaya, thriving under light or medium shade.

Axonopus affinis, Chase, is a native of the southern United States, and is common in the southern States from Carolina to Texas. This species was introduced as "Carpet grass" to the Central Experiment Station, Serdang, in 1921, seed being sent to the Department of Agriculture by the late Professor C. V. Piper of the Agronomy Section of the United States Department of Agriculture. It has been distributed to many parts of the peninsula, but has not yet spread widely.

DESCRIPTIONS

The two grasses are readily distinguished, although the broad-leaved species, *A. compressus*, in some circumstances, such as dry, shady conditions, produces long comparatively narrow leaves, little different superficially from those of *A. affinis*.

The distinguishing characters of the two species as found in Malaya differ slightly from those given by Miss Chase and detailed descriptions will be given below.

As stated above, the plants of *A. affinis* Chase, are more densely tufted than those of *A. compressus* Beauv. The former species is normally more free flowering, and the inflorescence peduncles are usually more elongated or extended.

Leaves.—Growing in the same conditions, the leaves of *A. compressus* are larger than those of *A. affinis*, the blades being much broader, though shorter.

Further distinguishing features are as follows:—

Leaf-blades of *A. compressus* are wavy-edged and bright green, with conspicuous hairy fringes along the edges of the lower three-quarters of the blades. The edges of the sheaths and the ventral surfaces of the blades are hairy, with a few hairs also on the backs of the blades. The blades taper more at the ends and have less blunt-pointed tips.

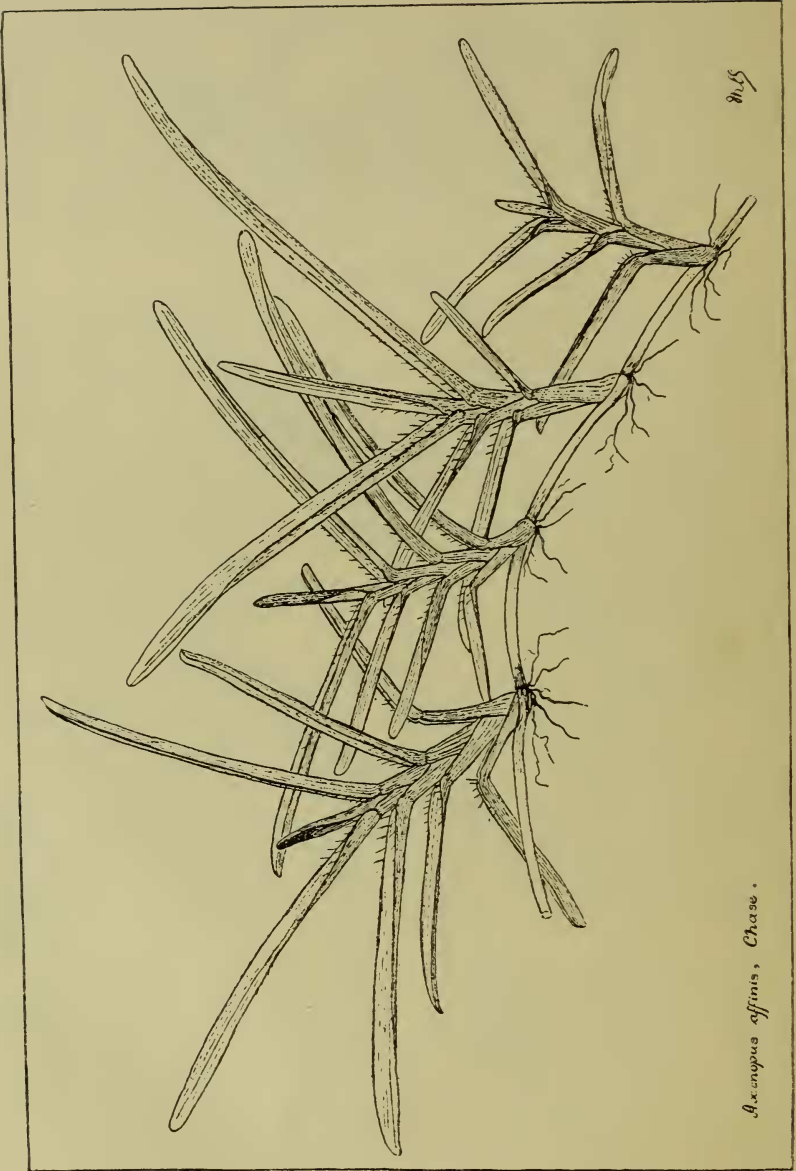
The leaf-blades of *A. affinis* are longer and stiffer, and are slightly duller green in colour. They are very much less hairy, sometimes hairless, but usually with comparatively few, though long, hairs along the edges of the blades and sheaths, and seldom any on the surfaces of the blades. The edges of the blades are nearly parallel and the tips are blunt. The ends of the leaf-blades in both species are minutely hairy.

The backs of the blades of *A. affinis* are much more prominently keeled, and tend to fold in two, especially when withered or dry.



Aeluropus compressus, Beauv.

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A further point of difference between the two species is that a red coloration in the leaves of *A. compressus* is very common especially in dry exposed situations, but it is extremely rare in those of *A. affinis*.

Stolons.—Both species are freely stoloniferous; stolons vary from fairly slender to comparatively stout, and there is little if any difference between the species in this respect. Stolons are branching; inter-nodes are short, shorter on the average in *A. affinis*; nodes are free-rooting.

In *A. compressus* the stolon nodes are very white-hairy, but in *A. affinis* they are only sparsely hairy.

In *A. compressus* the leaf-blades of the stolon growth stages are often conspicuously shorter than those of flowering culms, while in *A. affinis* this is not so notable.

A. compressus is now fairly common under rubber trees, and there grows most often in tufted fashion, conditions presumably being not very favourable for normal stoloniferous growth.

Flowering Culms.—Every stolon node bears a potential flowering shoot and when circumstances demand or are suitable, shoots from the nodes form flowering culms. At times, small or large leafy colonies of flowering culms are produced on branching rhizomes from the stolon nodes.

The flowering culms proper have only one inter-node, though at times they appear to have two or three. These extra internodes are the result of stoloniferous internodes being formed and assuming a more or less erect attitude, due to the urge to form floral organs coinciding with good conditions for vegetative growth.

The flowering culms develop with the elongation of the basal internode, from the upper node of which and within the final leaf-sheath is a conic "disc" bearing 4 to 6 long bracts each subtending an inflorescence peduncle.

The blade of the uppermost leaf is short, especially so in *A. affinis*.

The nodes of the flowering culm are, in *A. compressus*, most usually densely white-hairy, though not always all the way round, while in *A. affinis* only the edges of the compressed nodes are (usually) hairy, but sometimes quite glabrous.

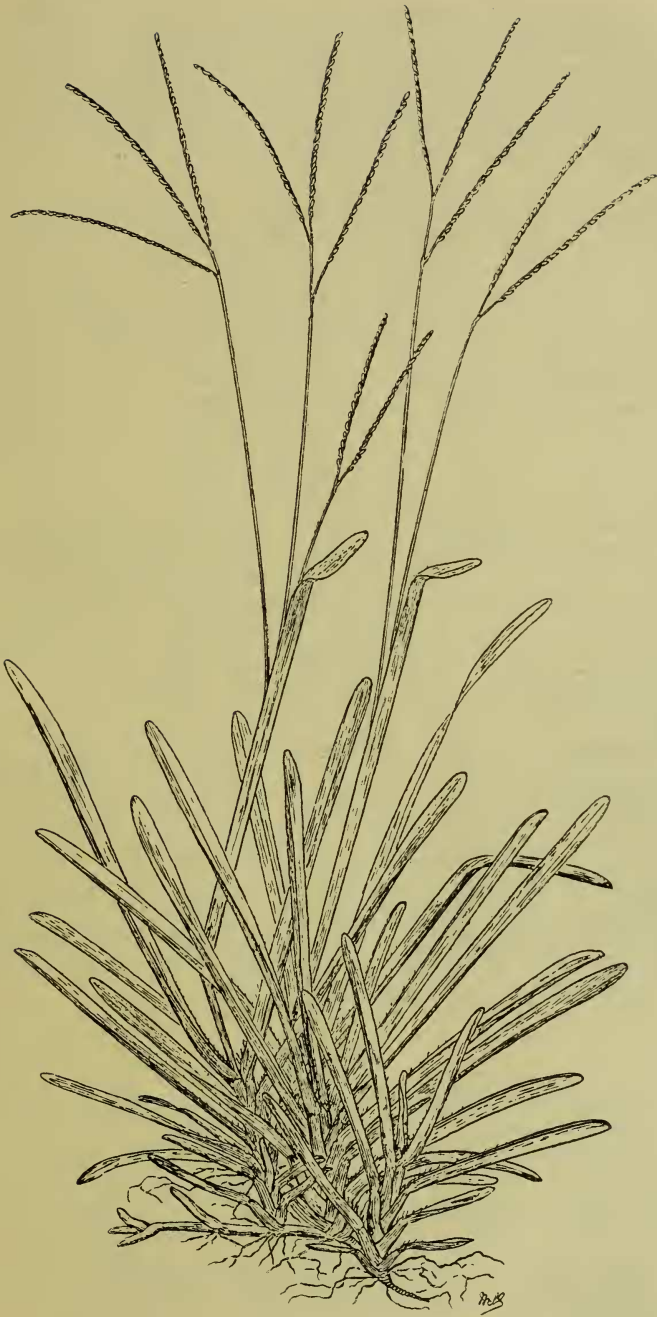
The full details of the morphological differences of the flowering culms are however, more conveniently described by taking each species separately.

Axonopus compressus Beauv. Flowering culms fairly slender, compressed. Nodes more or less silky hairy, leaf-blades 5 to 14 mm. wide, 6 to 28 cm. long; uppermost blade usually short but from 3 to 19 cm. long. From the cone on upper node of culm, 4 to 6 slender peduncles (1 to 4 conspicuous) 10 to 30 cm. long. Very frequently in *A.*



Axonopus compressus. Beauv

Gardens Bulletin, S.S.



Axonopus affinis, Chase

compressus, these inflorescence peduncles remain short, and are not elongated beyond the mouth of the leaf-sheath. Each peduncle bears 2 or 3, rarely 4 to 6 slender racemes, the first two of which are at the apex of the peduncle, one terminal, the second subterminal, with others, when present, alternately at short intervals below. Racemes 4 to 10 cm. long.

Spikelets usually silky hairy, not closely spaced, alternating in two rows on a slender flattened or triangular rachis. Spikelets 2.0 to 2.8 mm. long, 0.8 to 1.0 mm. broad. Glumes II and III membranous, pale green with darker veins, hairy, conspicuously pointed, and extending beyond the fruit. Glume II often reddish coloured. Glume IV and palea chitinous. Stamens three, anthers yellow (when full of pollen) with narrow purple outer edges. Stigmas white.

Axonopus affinis Chase. Usually more free flowering than *A. compressus*. Flowering culms slender, compressed. Nodes more or less glabrous. Leaf-blades 4 to 8 mm. wide, 6 to 30 cm. long, uppermost blade on culm very short, 2 to 6 cm. long. From cone on upper node of culm 3 to 6 very slender peduncles (1 to 3 conspicuous), 15 to 30 cm. long. Each peduncle bears 2 or 3, occasionally 4 to 6, slender racemes, the first two racemes at the apex of peduncle, one terminal, the second subterminal, the others, when present, alternating at short intervals below. Racemes 3 to 10 cm. long.

Spikelets usually hairy, not very closely spaced, alternating in two rows along a slender flattened or triangular rachis, 1.8 to 2.2 mm. long, 0.8 to 1.0 mm. broad (they are much less pointed than those of *A. compressus*). Glumes II and III membraneous, pale green with dark veins hairy, hardly extending or extending to a short point beyond the fruit, mid vein very indistinct. Glume II often reddish coloured. Glume IV and palea chitinous. Stamens three, anthers purple with translucent dots. Stigmas mauve.

Both species produce seed freely.

UTILITY

A. affinis withstands dry weather better than *A. compressus* and is capable of covering the soil better in dry exposed situations. On poor, unshaded soil, in this country, the former species frequently grows by densely-leafy, short internoded stolons, and it is probable that it will, in time, largely predominate in such conditions.

Under medium shade, however, where both make their best growth, *A. compressus* appears to have a distinct advantage.

There is some slight confusion as to palatability and value of carpet grass as pasture, but this is partly due to the previous confusion of two species with but one name.

There is no doubt that the true *Axonopus compressus* Beauv. is a good pasture grass, being recognised as such in tropical America and Australia. It appears equally true that *A. affinis* has a variable reputation. It is definitely regarded as inferior in Australia, and chemical analyses quoted by McLennan clearly show it to be inferior, as fodder, to *A. compressus*.

In Malaya a few years ago *A. affinis* appeared to be liable to cause purging of cattle, due to a slight increase in hydrocyanic acid content if cut at too short intervals. The author has, however, seen *A. affinis*, under light shade, grazed by cattle with relish, and obviously in preference to *Paspalum conjugatum*.

SUMMARY

A detailed account is given of the two species *Axonopus compressus* Beauv., and *Axonopus affinis* Chase, and the differences between them.

The chief distinguishing features may be summarised as follows:—

<i>A. compressus</i> Beauv. Savannah Grass.	<i>A. affinis</i> Chase. Carpet Grass.
LEAVES.—Broad, hairy frequently with red colouration.	Narrower, stiff, folded, more or less glabrous.
NODES.—Very hairy.	Hardly hairy.
SPIKELETS.—Long and pointed.	Blunt or short pointed.
ANTHERS.—Yellow with narrow purple outer edges.	Purple, with translucent dots.
STIGMAS.—White.	Mauve.

The writer wishes to acknowledge with thanks much careful work by his Laboratory Assistant, Che Mohd. Kassim, in the preparation of the illustrations.

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